

Document No.: R5-ARD-0003-r2

Title: VOC Sampling

Effective Date: 09/29/2017



U.S. Environmental Protection Agency, Region 5 Field Quality Procedures

TECHNICAL FIELD STANDARD OPERATING PROCEDURE

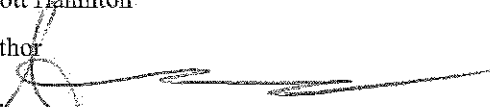
Standard Operating Procedure for collection of VOC samples

Effective Date	Number
9/29/2017	R5-ARD-0003-r2

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Signature: 

Date: 9/20/17

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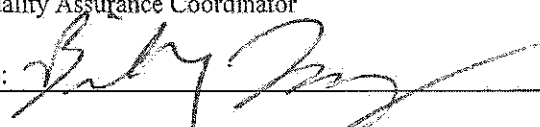
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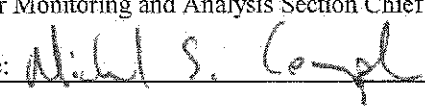
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REVISION/CHANGE HISTORY

The table below identifies changes to this controlled document and the respective effective date(s) over time.

Revision Number	History/Change Description	Document Author/Owner	Management Approver	Effective Date
0	Original Document	Chad McEvoy	Michael Compher	03-31-2015
1	Updated to include Canister Sampling Field Test Data Sheet, more specific instructions for conducting the sample collection, and other minor edits	Jacqueline Nwia	Michael Compher	05-03-2017
2	Added language on evidence tampering and deleted option to ship samples.	Scott Hamilton	Michael Compher	9-29-2017

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1.0 PURPOSE

1.1 This standard operating procedure describes steps for collecting air samples in the field for later analysis at Region 5 Chicago Regional Laboratory (CRL). This SOP is intended for use by field technicians so samples are collected consistently and documented properly.

2.0 APPLICABILITY/SCOPE

2.1 This document applies to the collection of air samples in the field. Field technicians should follow this SOP to ensure samples are collected properly and consistently, and that all documentation is completed.

2.2 The official signed copy of this SOP will be stored in the QA Tracking system under the folder "VOC SOP" and will be available to all field sampling staff. The SOP should be reviewed annually.

2.3 This document outlines obtaining the sampling vessels (i.e. bottles or canisters) from CRL, collecting and documenting the sample in the field, completing the chain-of-custody, and returning the samples to CRL.

2.4 This SOP is written to provide general instruction for collecting samples; individual projects will have specific needs and processes. Refer to the project specific Quality Assurance Project Plan (QAPP) or sampling plan for details.

3.0 DEFINITIONS

COC	Chain of Custody
CRL	Chicago Regional Laboratory
GMAP	Geospatial Monitoring of Air Pollutants
PID	Photo Ionization Detector
QAPP	Quality Assurance Project Plan
VOC	Volatile Organic Compounds

4.0 SUMMARY OF METHOD/PROCEDURE

4.1 Field staff will use containers supplied by CRL to collect air samples by opening the

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valve on the canister, allowing the sample to enter the canister or bottle and then closing the valve. Samples may be grab samples or composite samples collected over a period of time. Staff will document relevant information on the sample labels (supplied by CRL), Canister Sampling Field Test Data Sheet (from Compendium Method TO-15) and chain of custody form (supplied by CRL). Labelled samples, Field Test Data Sheet and the chain of custody form(s) are then returned to CRL's sample custodian. Results will be reported by CRL at a future date.

5.0 PERSONNEL QUALIFICATION/RESPONSIBILITIES

5.1 Personnel involved in the collection of samples must meet the minimum training requirements for safety and technical expertise. Minimum training will include a background in air programs and hands on training with CRL or air monitoring personnel. The field staff is also responsible for reviewing this SOP prior to conducting sampling using passive canisters. Approved copies of this SOP and the project-specific air monitoring Quality Assurance Project Plan (QAPP) will be available to field staff throughout the duration of sampling activities.

6.0 EQUIPMENT AND SUPPLIES

6.1 Equipment used for the collection of VOC samples will vary depending on the objective of the project and the compounds of interest. Metal canisters or glass bottles could be used to hold the sample, and different volumes of containers are available. Both factors are dictated by the compounds of interest, project goals, and resource availability. Regulators/orifices (obtained from CRL and provided with the vessels) may be attached to the vessels to restrict the flow, allowing for a longer and/or specific sampling time.

6.2 Sample labels and chain of custody form will be supplied by CRL to document sample information.

7.0 REAGENTS AND STANDARDS

7.1 No reagents or standards are used during sample collection.

7.2 All reagents and standards used as part of the laboratory analysis can be found in section 7 (Reagents & Standard Gas Mixtures) of the Central Regional Laboratory's "SOP for VOCs in Air from TO-15" CRL SOP MS-005 Revision 6, Dated 06/04/2013.

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8.0 HEALTH AND SAFETY CONSIDERATIONS

8.1 Field staff must complete the minimum safety training as required by the USEPA. Minimum safety trainings include the USEPA 24-hour field safety course and annual 8 hour refresher courses as required. Any necessary health and safety equipment needs for specific projects must be made in coordination with the Regional Safety Manager.

9.0 INTERFERENCES

9.1 The possibility of contamination of canister samples exists due to the improper handling and wear of canister valves.

9.2 Special attention must be given to canisters with QT valves; QT valves are normally in a closed position to minimize leakage, a protective cover should be placed over the valve to minimize leakage and prevent contamination of the canister. Bottles with QT valves should be evacuated using a dual stage pump in the field on the day of sampling, or as close to the day of sampling as possible. The dual stage pump should be capable of creating a strong vacuum within the bottle.

9.3 Additional possibilities of laboratory and storage contamination and preventative procedures can be found in section 5 (Caution & Interferences) of the Central Regional Laboratory's "SOP for VOCs in Air from TO-15" CRL SOP MS-005 Revision 6, Dated 06/04/2013.

10.0 PROCEDURE

10.1 Instrument or Method Calibration and Standardization

1. No instrument or method calibrations are expected for sample collection.
2. Steps should be taken to standardize sample collection as much as possible. Field technicians should consider the following:
 - a) Avoid wearing perfumes, lotions, or hand sanitizers prior to or during sample collection.
 - b) Record data (GPS values, time, etc) from the same source each time.
 - c) If taking grab samples, hold away from the body.
 - d) Note any nearby activity that may influence the sample on the sample label and in field notes.

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- e) An upwind or background sample may be helpful; refer to the project QAPP or sampling plan.
- f) Copy or photograph sample labels and the completed chain of custody form.

10.2 General field or equipment procedures

1. Field staff must request VOC sample bottles or canisters from CRL's sample coordinator (Amanda Wroble) by completing "CRL Form 008 Rev 1.1- November 2013". CRL chemists are available to discuss, and recommend, possible lab analyses. The lab may need some time to ensure sufficient, appropriate sample containers are available, and may need time to prepare the analysis equipment. Field staff should also be familiar with the sample return process in order to efficiently return the samples to the sample custodian (Rob Snyder 312-353-9083). Information on shipping samples are available on CRL Form 008 Rev 1.1- November 2013.
2. Field personnel that collect potential evidence for enforcement purposes, must follow established procedures or guidance to document and demonstrate custody and integrity of the sample of the samples.
3. Field samples and appropriate environmental data shall be maintained under custody at all times during field activities. Samples and data are in custody if they are:
 - a. Within the direct possession or the control (i.e. within the view) of an individual designated to have sample handling responsibilities; or
 - b. Placed in a designated area to prevent tampering; or
 - c. Maintained in a manner that ensures the integrity of the samples is not compromised when placed in an unsecured area.

10.3 Sample Collection

- a. Grab sample Procedure:
 1. Choose canister and gather COC and canister sticker (if applicable).
 2. Record all information on the sample label provided by CRL and place the label on the canister.
 3. Record all information on the COC as follows. If errors are made on the form strike through with one line, initial and date the error. Then write the correct information on the form. A sample COC form is in Appendix C. It is acceptable to use two lines for one canister to record information if needed. Be sure to draw a full line through the row in the areas where additional space was not needed.
 - a. PROJECT NAME = Project name should be a unique name for you to identify this group of samples.
 - b. SAMPLER NAME = Write the samplers name and signature.

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- c. STA. NO. = Station Number. For the first canister write "1" for the second canister write "2", etc.
 - d. DATE = write the date.
 - e. TIME = write the time the sample was taken. This should be filled out last since it will take some time to complete all paperwork before the sample is actually taken.
 - f. COMP/GRAB = "Composite or Grab Sample". Check the box under Grab sample.
 - g. STATION LOCATION = Write the GPS coordinates of where the sample was taken.
 - h. NO. OF CONTAINERS = "1"
4. Remove the ¼ inch cap from the inlet of the canister.
 5. Hold the canister out away from the sampler's body facing the direction where the air is coming from and in the direction of the air you want to sample. Hold the canister as far as possible with the inlet facing away from you, above your head, if possible.
 6. Open the canister valve (righty-tighty, lefty loosey). The sampler should hear a distinct hiss for 5-10 seconds. This sound is the sample canister filling up with sample air.
 7. Leave the valve open until the hissing stops and then close the valve tightly. Replace the ¼ inch cap and tighten.
 8. Record the sample time on the COC.
 9. Place the canister back in the box and store it in a safe spot under lock and key. Sample should be delivered to CRL as soon as possible. Ensure that the sampler signs and dates the COC under "relinquished by" and that the sample custodian signs and dates the COC under "received by". The pink copy should be given to the sampler.
 10. Additional notes may be helpful such as pressure, temperature, other meteorological conditions and distinct odors.
- b. Composite sample Procedure:
1. Choose canister and gather COC, canister sticker (if applicable) and field data form.
 2. Record all information on the sample label provided by CRL and place the label on the canister.
 3. Record all information on the COC as follows. If errors are made on the form strike through with one line, initial and date the error. Then write the correct information on the form. A sample COC form is in Appendix C. It is acceptable to use two lines for one sample to record information if needed. Be sure to draw a full line through the row in the areas where additional space was not needed.

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- a. PROJECT NAME = Project name should be a unique name for you to identify this group of samples.
 - b. SAMPLER NAME = Write the samplers name and signature. Each sampler must utilize their own COC.
 - c. STA. NO. = Station Number. For the first canister write "1" for the second canister write "2", etc.
 - d. DATE = write the date.
 - e. TIME = write the time the sample begins.
 - f. COMP/GRAB = "Composite or Grab Sample". Check the box under Composite sample.
 - g. STATION LOCATION = Write the GPS coordinates of where the sample was taken.
 - h. NO. OF CONTAINERS = "1"
4. Remove the ¼ inch cap from the inlet of the canister.
 5. Install the sample inlet assembly and tighten snugly with a 9/16" wrench.
 6. Place the canister in the desired sampling position.
 7. Record the following information on the Canister Sampling Field Test Data Sheet (Appendix D). Note that not all information requested on the general TO-15 form is needed.
 - a. Site Location
 - b. Sampling Date
 - c. Canister SN
 - d. Operator
 - e. Temperature Start Ambient
 - f. Canister Pressure start
 - g. Local Time start
 - h. Leave all of Section C blank
 8. Open the canister valve (righty-tighty, lefty loosey).
 9. The canister is now filling. It is a good idea to return to the station in a few hours to observe the pressure. It is imperative that the canister still be under slight vacuum at the conclusion of the sampling time.
 10. At the conclusion of the sampling time close the valve tightly, remove the sample inlet assemble and replace the ¼ inch cap and tighten.
 11. Record the following information on the Canister Sampling Field Test Data Sheet (Appendix D). Note that not all information requested on the general TO-15 form is needed.
 - a. Temperature End Ambient
 - b. Canister Pressure End
 - c. Local Time Stop
 - d. Leave all of Section C blank

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12. Place the canister back in the box and store it in a safe spot under lock and key. Sample should be delivered to CRL as soon as possible. Ensure that the sampler signs and dates the COC under "relinquished by" and that the sample custodian signs and dates the COC under "received by". The pink copy should be given to the sampler.
13. Additional notes may be helpful such as other meteorological conditions and distinct odors.

10.4 Sample Handling and Preservation

1. Samples should be handled gently and packed to prevent breakage. Ensure all information has been recorded on sample labels.
2. Immediately transport samples back to CRL's sample custodian with completed Canister Sampling Field Test Data Sheet and COC.

10.5 Sample Preparation and Analysis

Samples will not be prepared or analyzed in the field. Samples will be prepared and analyzed by CRL following their procedures in the laboratory.

10.6 Troubleshooting

1. Field technicians should inspect sample vessels before collecting a sample to be sure the vessel hasn't been compromised prior to use. Do not use any vessel suspected of having a leak prior to sample collection.
2. Technicians may hear a hiss or pop as air rushes into a vessel (especially for a grab sample). No sound may indicate the vessel leaked prior to use.
3. Record all information onto the sample label at the time of collection.

10.7 Data Acquisition, Calculations, and Data Reduction

N/A

10.8 Data Review and Acceptance

Ensure all fields on the sample label(s), Canister Sampling Field Test Data Sheet and chain of custody form(s) have been completed.

11.0 WASTE MANAGEMENT

N/A

12.0 DATA AND RECORDS MANAGEMENT

- 12.1 All COC forms and other field notes will be submitted to the project manager and

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will be stored with other data associated with the project (i.e. GMAP data). The CRL will complete analysis of the canisters or bottles as soon as possible after sampling. CRL will submit validated data to the project manager.

13.0 QUALITY CONTROL & QUALITY ASSURANCE

The field staff must note any deviations from the sample plan or procedure on the sample label and field notes. Also note anything unusual or unexpected that may influence the sample results (i.e. markers, vehicle fuels, newly paved roads, nearby non-target activities, etc.).

14.0 REFERENCES

SOP for VOCs in Air from TO-15 CRL SOP MS-005 Revision 6, Dated 06/04/2013

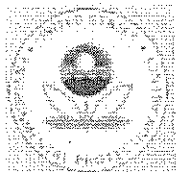
15.0 ATTACHMENTS

APPENDIX A	CRL Form 008 Rev 3- March 2017
APPENDIX B	CRL Sample Label
APPENDIX C	CRL Chain of Custody
APPENDIX D	COMPENDIUM METHOD TO-15 CANISTER SAMPLING FIELD TEST DATA SHEET

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APPENDIX A

CRL Form 008 Rev 3- March 2017



**U.S. ENVIRONMENTAL PROTECTION AGENCY—REGION 5
CHICAGO REGIONAL LABORATORY
ANALYTICAL REQUEST FORM**

This analytical request form should be completed before sending samples to CRL for analysis. The requester should complete all relevant fields and email the form and electronic copy of the quality assurance project plan (QAPP) and/or sampling plan to the CRL Sample Coordinator Rob Thompson (Thompson.robert@epa.gov).

GENERAL PROJECT INFORMATION

Requester:		Request Date:	
Title:		Division/Office:	
Address:			
Phone:		E-mail:	
<input type="checkbox"/> One-time or <input type="checkbox"/> Continuous request (<i>check one</i>)			
A continuous request is defined as a standing request for the same analytical service (analyses and sample matrices) that may span several sites/projects/sampling events. Please note that submission of this analytical request form is only required once for a continuous request. However, QAPPs and/or sampling plans should still be submitted for every site/project.			
Site Name and Location:			
Expected Arrival Date at CRL:			
Turnaround Time Requested (<i>standard TAT is 45 days</i>):			

CRL ANALYTICAL SERVICES

Disclaimer:

The effective versions of all Standard Operating Procedures (SOPs) are available in pdf format on the R5 Intranet. By submitting an analytical request form, the requestor is implying consent for the use of the appropriate effective SOPs. It is the responsibility of the requester to check the intranet for SOP deviations (known at CRL as Pen&Ink changes) and version updates. Should the CRL suspect that an SOP deviation affect the data, the CRL Sample Coordinator will contact the requester via email or phone to obtain a Pen&Ink consent. As defined by CRL, SOP deviations "affect the data" when there is a change in the laboratory's ability to identify or quantify the analytes in the SOP or when there is a deviation in the regulatory method.

Form Instructions:

1. In the table below, select the appropriate checkbox to request an analysis and enter the proposed number of samples of each matrix type. An analysis is not currently available for a matrix where the box is shaded.
2. For other/waste, briefly describe the matrix in the space provided. Additional space for a detailed matrix description is available at the end of the table, if needed.
3. For multi-analyte tests, list specific classes/subsets (e.g., PAHs, RCRA metals, etc.) in the space given at the end of this table, if requested.

General Chemistry

Analysis Request		Sample Matrix and Number		
Analysis	Check to Request	soil/sediment	water/liquid	other/waste*
acidity	<input type="checkbox"/>		_____	_____
alkalinity	<input type="checkbox"/>		_____	_____
ammonia-N	<input type="checkbox"/>	_____	_____	_____
anions**	<input type="checkbox"/>	_____	_____	_____
biochemical oxygen demand-5 day (BOD)	<input type="checkbox"/>		_____	_____
carbonaceous BOD-5 day (CBOD)	<input type="checkbox"/>		_____	_____
corrosivity by pH	<input type="checkbox"/>		_____	_____
cyanide, amenable to chlorination	<input type="checkbox"/>		_____	_____
cyanide, total	<input type="checkbox"/>	_____	_____	_____
dissolved organic carbon (DOC)	<input type="checkbox"/>		_____	_____
fluoride	<input type="checkbox"/>	_____	_____	_____
grain size	<input type="checkbox"/>	_____		_____
ignitability by flashpoint	<input type="checkbox"/>		_____	_____
nitrate-nitrite-N	<input type="checkbox"/>		_____	_____
paint filter liquid test	<input type="checkbox"/>		_____	_____
pH	<input type="checkbox"/>	_____	_____	_____
residue, filterable (TDS)	<input type="checkbox"/>		_____	_____
residue, non-filterable (TSS)	<input type="checkbox"/>		_____	_____
solvent ID	<input type="checkbox"/>		_____	_____
total Kjeldahl nitrogen (TKN)	<input type="checkbox"/>	_____	_____	_____
total organic carbon (TOC)	<input type="checkbox"/>	_____	_____	_____
total phosphorus (TP)	<input type="checkbox"/>	_____	_____	_____
total dissolved phosphorus (TDP)	<input type="checkbox"/>		_____	_____
total solids (TS)	<input type="checkbox"/>		_____	_____
total volatile solids (TVS)	<input type="checkbox"/>		_____	_____
turbidity	<input type="checkbox"/>		_____	_____
water content	<input type="checkbox"/>		_____	_____

Metals

Analysis Request		Sample Matrix and Number		
Analysis	Check to Request	soil/sediment	water/liquid	other/waste*
chromium (VI)	<input type="checkbox"/>	_____	_____	_____
dissolved metals** (except Hg & Cr (VI))	<input type="checkbox"/>	_____	_____	_____
hardness	<input type="checkbox"/>	_____	_____	_____
mercury (Hg)	<input type="checkbox"/>	_____	_____	_____
total metals** (except Hg & Cr (VI))	<input type="checkbox"/>	_____	_____	_____ wipe/filter

Organics

Analysis Request		Sample Matrix and Number		
Analysis	Check to Request	soil/sediment	water/liquid	other/waste*
air toxics**	<input type="checkbox"/>	_____	_____	_____ air
1,4-dioxane, low level	<input type="checkbox"/>	_____	_____	_____
oil & grease	<input type="checkbox"/>	_____	_____	_____
polychlorinated biphenyls (PCB) congeners	<input type="checkbox"/>	_____	_____	_____
perfluorinated compounds** (PFCs)	<input type="checkbox"/>	_____	_____	_____
pesticides, chlorinated**	<input type="checkbox"/>	_____	_____	_____
PCB aroclors**	<input type="checkbox"/>	_____	_____	_____
semi-volatiles** (SVOCs)	<input type="checkbox"/>	_____	_____	_____
total petroleum hydrocarbons (TPH as DRO/ORO)	<input type="checkbox"/>	_____	_____	_____
(tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC)	<input type="checkbox"/>	_____	_____	_____
volatiles** (VOCs)	<input type="checkbox"/>	_____	_____	_____

Toxicity Characteristic Leaching Procedure (TCLP)

Analysis Request		Sample Matrix and Number		
Analysis	Check to Request	soil/sediment	water/liquid	other/waste*
TCLP Hg	<input type="checkbox"/>	_____	_____	_____
TCLP metals	<input type="checkbox"/>	_____	_____	_____
TCLP pesticides	<input type="checkbox"/>	_____	_____	_____
TCLP SVOCs	<input type="checkbox"/>	_____	_____	_____
TCLP VOCs	<input type="checkbox"/>	_____	_____	_____

***Additional Matrix Description**

Please describe *other/waste* matrix, if not specified above:

****Specific Analyte Class/Subset Request**

Please list or attach specific class/subset for multi-analyte test, if requested:

NON-STANDARD REQUESTS

For analyses/matrices not listed above or to obtain analyte lists, quality control limits, and/or reporting limits, please contact the CRL Sample Coordinator to discuss. (Thompson.robert@epa.gov, 312-353-9078)

CRL DATA FORMAT

The CRL standard data deliverable includes: 1) a pdf of the work order 2) a pdf of the final Level II report and 3) an electronic data deliverable (EDD) that includes batch quality control sample data. EDD typically refers to an Excel spreadsheet of the data, but EDDs are available in a variety of formats and can be customized upon request. A full data package (Level IV) is also available upon request and will be transmitted electronically via the CRL SharePoint. Contact Sylvia Griffin, CRL Data Coordinator, for additional details. (Griffin.sylvia@epa.gov, 312-353-9073)

CRL SAMPLE DISPOSAL POLICY

Due to space limitations in a controlled temperature environment, samples are relocated to secure room temperature storage six months after the analysis completion of the project. Notification of the intent to relocate the samples is given to the customer with sufficient time for the customer to respond with any objections. Samples remain in secure room temperature storage until the case/project is completed and the samples are no longer needed. Notification is given to the customer with sufficient time for customer response prior to sample disposal.

CRL SAMPLE SHIPMENT REQUIREMENTS

Before collecting samples, please refer to the attached table for sample sizes, containers, and preservatives. Notify the CRL Sample Custodian (312.353.9083, Snyder.robert@epa.gov) and the CRL Sample Coordinator (312.353.9078, Thompson.robert@epa.gov) before shipping any samples and to arrange for sample receipt.

When packing samples for shipment:

- ✓ Seal individual samples in plastic bags, preferably Ziploc bags.
- ✓ The temperature of samples requiring refrigeration during transport MUST be maintained at or below 6°C.
- ✓ Ice in a sealed plastic bag or reusable ice substitute freeze packs are acceptable cooling media.
- ✓ Chain of custody forms MUST be sealed in a large Ziploc bag and taped to the inside of the cooler lid.
- ✓ Include the address to which the cooler should be returned.

After items are packed for shipment, secure the cooler with tape and attach a custody seal across the seam of the cooler lid.

All samples MUST be shipped overnight to arrive Monday thru Friday or hand-delivered. No deliveries are accepted on weekends or Federal holidays. Exceptions may be made on a case by case basis depending on sampling priority/emergency status.

Send all samples to:

Robert Snyder
US EPA Region 5
Chicago Regional Laboratory
536 S. Clark Street, 10th Floor
Chicago, IL 60605



U.S. EPA CHICAGO REGIONAL LABORATORY

HOLDING TIME AND CONTAINER REQUIREMENTS FOR WATER / AQUEOUS SAMPLES

DISCLAIMER: This table represents The Chicago Regional Laboratory's (CRL) recommended guidelines. Additional containers may be required for laboratory quality control samples (see notes section). There are non-routine analytes (reported upon request) that may require modification to the specifications detailed in this table. It is the client's responsibility to confirm container, preservation, and holding time requirements for a project prior to initiating sampling. This includes any equipment procurements, if applicable. No brand endorsements are made or implied.

General Chemistry	CRL SOP(s)	Reference Method	Holding Time (days)	Min. Volume (mLs)	Container ^a	Preservation
Acidity	AIG004A	SM 2310	14	50	500 mL Poly	<6 C
Alkalinity	AIG005	SM 2320 B	14	50	500 mL Poly	<6 C
Ammonia (Nitrogen, NH ₃) Distilled	AIG029B	SM 4500-NH ₃ B/H	28	50	500 mL Poly	pH<2, H ₂ SO ₄ , <6 C
Anions (Br, Cl, F, NO ₂ , NO ₃ , PO ₄ ³⁻ , SO ₄)	AIG045A	EPA 300.0	2 ^b or 28	10	250 mL Poly	<6 C
Biochemical Oxygen Demand (BOD) 5-day	AIG006, A	SM 5210 B	2	60	1 L Poly	<6 C
BOD, Carbonaceous (cBOD)	AIG006, A	SM 5210 B	2	60	1 L Poly	<6 C
Corrosivity	AIG003	EPA 9040C	365	20	250 mL Amber	<6 C
Cyanide, Amenable	AIG025A	SM 4500 CN ⁻ G	14	50	500 mL Poly	dechlorinate ^c NaOH, pH>10, <6 C
Cyanide, Total	AIG025C	EPA 335.4	14	50	500 mL Poly	dechlorinate ^c NaOH, pH>10, <6 C
Ignitability (Flashpoint)	AIG048A, B	EPA 1010A, 1020B	365	100	250 mL Clear	<6 C
Nitrogen, Nitrate+Nitrite	AIG031B	ASTM D7781-14	28	10	500 mL Poly	pH<2, H ₂ SO ₄ , <6 C
Nitrogen, Total Kjeldahl (TKN)	AIG035B	EPA 351.2	28	10	500 mL Poly	pH<2, H ₂ SO ₄ , <6 C
Organic Carbon, Dissolved (DOC)	AIG021D	EPA 5310B	28	20	500 mL Poly	field filtered ^d pH<2, H ₂ SO ₄ , <6 C
Organic Carbon, Total (TOC)	AIG021D	EPA 5310B	28	20	500 mL Poly	pH<2, H ₂ SO ₄ , <6 C
Paint Filter Liquid Test	AIG010	EPA 9095B	30	100	250 mL Amber	<6 C
pH	AIG002	SM 4500-H ⁺ B	15 min	50	250 mL Poly	<6 C
Phosphorus, Total Dissolved (TDP)	AIG034B	EPA 365.4	28	10	500 mL Poly	field filtered ^d pH<2, H ₂ SO ₄ , <6 C
Phosphorus, Total (TP)	AIG034B	EPA 365.4	28	10	500 mL Poly	pH<2, H ₂ SO ₄ , <6 C
Solids, Total Dissolved (TDS)	AIG017	SM 2540 C	7	50	500 mL Poly	<6 C
Solids, Total Suspended (TSS)	AIG018	SM 2540 D	7	100	500 mL Poly	<6 C
Turbidity	AIG054	EPA 180.1	2	30	250 mL Clear	<6 C
Water Content	AIG015A	EPA 9000	365	10	250 mL Amber	<6 C
Metals	CRL SOP(s)	Reference Method	Holding Time (days)	Min. Volume (mLs)	Container	Preservation
Chromium (VI)	AIG032A	EPA 218.5	28	50	250 mL Poly	pH 9.3-9.7, <6 C NaOH/(NH ₄) ₂ SO ₄
Hardness	Metals026	SM 2340 B	180	50	500 mL Poly	pH<2, HNO ₃
Mercury (Hg)	AIG044D, E	EPA 245.1/7470A	28	20	500 mL Poly	pH<2, HNO ₃
Metals, Total	Metals001, 003, 003A	EPA 200.7/200.8 EPA 6010D/6020B	180	50	500 mL Poly	pH<2, HNO ₃
Metals, Dissolved	Metals001, 003, 003A	EPA 200.7/200.8 EPA 6010D/6020B	180	50	500 mL Poly	field filtered ^d pH<2, HNO ₃
Organics	CRL SOP(s)	Reference Method	Holding Time (days)	Min. Volume (mLs)	Container	MS/MS ^e Preservation
1,4-Dioxane (low-level)	MS035	EPA 522/800GD	28 ^f	250	2 - 250 mL Amber	2 pH<2, NaHSO ₄ , <6 C
Chlorothalonil	MS033	EPA 525.3/8270D	7 ^f	40	3 - 40 mL Amber VOA	2 <6 C
Oil and Grease	GC030, 32	EPA 1664B	28	1 L	2 - 1L Clear wide-mouth	2 pH<2, H ₂ SO ₄ , <6 C
Polychlorinated Biphenyls (PCBs)	GC002, 003	EPA 608/8082A	7 ^h or 365 ⁱ	1 L	2 - 1L Amber	2 <6 C
PCB Congeners (oil only)	MS034	NA	365	1 gram	4 oz. jar	1 <6 C
Perfluorinated Compounds (PFCs)	OM012	NA	28	10	2 - 15 mL Polypropylene tube (preweighed)	4 <6 C
Pesticides (low level)	OM019	NA	28 ^f	10	3 - 40 mL amber VOA	2 <6 C
Pesticides, Chlorinated	GC001	EPA 608/8081B	7 ^f	1 L	2 - 1L Amber	2 <6 C
Petroleum Hydrocarbons (TPH as DRO/DRO)	GC034	EPA 8015C	7 ^f	1 L	2 - 1L Amber	2 <6 C
Semi-Volatile Organic Compounds (SVOCs)	MS026, 27	EPA 625/8270D	7 ^f	1 L	2 - 1L Amber	2 <6 C
Tetradecylphosphonium chloride (TTPC)	OM016	NA	30	10	3 - 40 mL Amber VOA	2 <6 C
Volatile Organic Compounds (VOCs)	MS023, 24	EPA 624/8260C	7 (unpreserved) 14 (Preserved)	40	3 - 40mL VOA no headspace	2 pH<2, HCl, <6 C
Waste Characterization	CRL SOP(s)	Reference Method	Holding Time (days)	Min. Volume (mLs)	Container	Preservation
Toxicity Characteristic Leaching Procedure (TCLP) ^h	GEN019	EPA 1311	Varies ⁱ	Varies ^j	Varies	<6 C

Notes:

^a Orthophosphate must be field filtered

^b Nitrite, nitrate, and ortho-phosphate have a 48 hour holding time

^c Dechlorinate with ascorbic acid

^d Field filtering should use a 0.45 µm filter

^e All containers must be filled completely and maintained on ice at ≤ 6 C

^f 40 day holding time post extraction

^g 28 day holding time post extraction

^h Can be requested for metals, Hg, Pesticides, SVOCs and VOCs

ⁱ Field collection->TCLP ext. (in days): 14 for organics, 28 for Hg, 180 for metals

^j Contact CRL for additional details and/or options

^k Applicable to method 608 only

^l Per sample. Does not include amount needed for QC samples or excess needed for dilutions/reanalysis

^m Extra containers needed for MS/MSD location. Frequency = 1/20 field samples



U.S. EPA CHICAGO REGIONAL LABORATORY

HOLDING TIME AND CONTAINER REQUIREMENTS FOR SOIL / SOLID SAMPLES

DISCLAIMER: This table represents The Chicago Regional Laboratory's (CRL) recommended guidelines. Additional containers may be required for laboratory quality control samples (see notes section). There are non-routine analytes (reported upon request) that may require modification to the specifications detailed in this table. It is the client's responsibility to confirm container, preservation, and holding time requirements for a project prior to initiating sampling. This includes any equipment procurements, if applicable. No brand endorsements are made or implied.

General Chemistry	CRL SOP(s)	Reference Method	Holding Time (days)	Min. Mass (g)	Container	Preservation ^a
Ammonia (Nitrogen, NH ₃)	AIG029B, 22A	SM 4500-NH ₃ B/H	28	1	4 oz. jar	<6 C
Anions (Br, Cl, F, NO ₃ , NO ₂ , PO ₄ , SO ₄)	AIG039, 45A	EPA 300.0	2 ^{a,b} or 28 ^b	10	4 oz. jar	<6 C
Chemical Oxygen Demand (COD)	AIG007A, 22A	410.4	28 ^b	10	4 oz. jar	<6 C
Cyanide, Total	AIG025B, C	EPA 335.4	14	1	4 oz. jar	<6 C
Nitrogen, Total Kjeldahl (TKN)	AIG022A, 35B	EPA 351.2	28 ^b	1	4 oz. jar	<6 C
Organic Carbon, Total (TOC)	AIG009A	ASA-SSSA	28 ^b	1	4 oz. jar	<6 C
Particle Size	AIG038, 38A	ASTM D2487-93	365	100	16 oz. jar	<6 C
pH	AIG008	EPA 9045D	365	20	4 oz. jar	<6 C
Phosphorus, Total (TP)	AIG022A, 34B	EPA 365.4	28 ^b	1	4 oz. jar	<6 C
% Solids	AIG019	SM 2540 G	7	10	4 oz. jar	<6 C
Metals	CRL SOP(s)	Reference Method	Holding Time (days)	Min. Mass (g)	Container	Preservation
Chromium (VI)	AIG033A	EPA 7199/3060A	30	2.5	4 oz. jar	<6 C
Mercury (Hg)	AIG043C,D,E	EPA 245.5/7471B EPA 7473	28	1	4 oz. jar	<6 C
Metals, Total	Metals001, 003A, 004	EPA 200.7/200.8 EPA 6010C,D/6020B	180	100	4 oz. jar	<6 C
Organics	CRL SOP(s)	Reference Method	Holding Time (days)	Min. Mass (g)	Container	Preservation
Pesticides, Chlorinated	GC001	EPA 8081B	14 ^m	10	8 oz. jar	<6 C
Polychlorinated Biphenyls (PCBs)	GC002, 003	EPA 8082A	365 ^m	10	8 oz. jar	<6 C
PCB Congeners	MS034	NA	365	30	8 oz. jar	<6 C
Perfluorinated Compounds (PFCs)	OM013	NA	28	2	50 mL Polypropylene Tube ^k	<6 C
Petroleum Hydrocarbons (TPH as DRO/ORO)	GC034	EPA 8015C	14 ^m	30	8 oz. jar	<6 C
Polycyclic Aromatic Hydrocarbons, Alkylated	MS026	NA	14 ^m	30	8 oz. jar	<6 C
Semi-Volatile Organic Compounds (SVOCs)	MS026	EPA 8270D	14 ^m	30	8 oz. jar	<6 C
Tetradecylphosphonium chloride (TTPC)	OM017	NA	NA	2	4 oz. jar	<6 C
Volatile Organic Compounds (VOCs)	MS001	EPA 8260C	2	5	3 Encores TM or 3 VOA vials w/ stir bar ^{e,f,j}	<6 C
Waste Characterization	CRL SOP(s)	Reference Method	Holding Time (days)	Min. Mass (g)	Container	Preservation
Toxicity Characteristic Leaching Procedure (TCLP) ^h	GEN019	EPA 1311	Varies ^h	Varies ^h	16 oz. jar	<6 C
HOLDING TIME AND CONTAINER REQUIREMENTS FOR FILTERS / WIPE SAMPLES						
Organics	CRL SOP(s)	Reference Method	Holding Time (days)	Num. of Wipes	Container	Preservation
Polychlorinated Biphenyls (PCBs)	GC002, 003	EPA 8082A	365 ^m	1 wipe w/ hexane	4 oz. jar	<6 C
Semi-Volatile Organic Compounds (SVOCs)	MS026	EPA 8270D	14 ^m	1 wipe w/ isopropanol	4 oz. jar	<6 C
HOLDING TIME AND CONTAINER REQUIREMENTS FOR AIR / VAPOR SAMPLES						
Volatiles	CRL SOP(s)	Reference Method	Holding Time (days)	Pressure	Vessel	Preservation
Air Toxics	MS005	TO-15	30	approx. -7 "Hg	2.7 L Summa ^l	Ambient

Notes:

^a Nitrite, nitrate, and ortho-phosphate have a 48 hour holding time

^b Holding time after extraction

^c All jars should be wide mouthed and have a Teflon lid

^d All containers must be filled completely and maintained on ice at ≤ 6 C

^e If no additional organics are requested, a 4 oz. jar must be submitted for % solids. For MS/MSD locations, 3 extra encores/VOA vials are need. Frequency = 1/20 field samples

^f Dispensed in preweighed 40 mL VOA vials with stir bar.

Preferred over EncoreTM or similar^h. No brands are endorsed by CRL.

^h Can be requested for metals, Hg, Pesticides, SVOCs and VOCs

^m Field collection->TCLP ext. (in days): 14 for organics, 28 for Hg, 180 for metals.

ⁿ Contact CRL for additional details and/or options

^o Collected w/ a 5 gram coring device (e.g. TerracoreTM or similar)

^k Must be preweighed

^l Per sample. Does not include amount needed for QC samples or excess needed for dilutions/reanalysis.

^j 40 day holding time post extraction.

Document No.: R5-ARD-0003-r2

Title: VOC Sampling

Effective Date: 09/29/2017

APPENDIX B

CRL Sample Label

1. Completed CRL Sample Label – Example

Container # 0489	Site Name Lake Mills
Regulator # NA	Sampler
Start Date 9/2/14	Start Time 14:58
Start Pressure NA	End Time 14:58
End Pressure Ambient	
Wind Direction/Speed 273°	
Humidity	
Temperature	43° 3' 1" N
43° 02' 46.8230" NA	88° 57' 11" W
88° 56' 63920" NA	

Document No.: R5-ARD-0003-r2
 Title: VOC Sampling
 Effective Date: 09/29/2017

APPENDIX C

CRL Chain of Custody

1. Completed CRL Chain of Custody Form – Example

REGION 5
77 West Jackson Boulevard
Chicago, Illinois 60604
Activity Code:

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME	SAMPLERS: (Print Name and Sign)	NO. OF CONTAINERS	STATION LOCATION	TAG NUMBERS
	Verso	Scott Hamilton			
1	7/24/14:30	X	44.40622768, -87.83103094	1	SN 01117 DW
2	7/24/14:52	X	44.40623587, -87.83104368	1	SN 00112 DW
3	7/24/14:43	X	44.37239245, -87.82745709	1	SN 00392 UPR-8724/11 UW
4	7/24/14:57	X	44.40733769, -87.83049574	1	SN 00124 DW (SN 03490 (A))
5	7/24/15:21	X	44.37856372, -87.830835	1	SN 00384 UPR-C / SN 03500 (A)
6	7/25/14:40	X	44.42552801, -87.8346142	1	SN 01113 DW
7	7/25/15:04	X	44.41958244, -87.83545427	1	SN 01098 DW
8	7/25/15:32	X	44.42085309, -87.83265502	1	SN 109 DW
9	7/25/15:43	X	VOID SAMPLE	1	SN 01105 DW-C / SN 3500 (reg lab)
10	7/25/15:43	X	44.42085348, -87.83265531	1	SN 01100 DW-C / SN 3500 (reg)
11	7/25/15:59	X	44.41770465, -87.83092477	1	SN 00321 DW-8724/11 UW / SN 03490 (A)
12	7/26/12:14	X	40.02858677, -87.89303607	1	SN 00286

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Ship To:
<i>[Signature]</i>	7/26/17 15:21		
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	ATTN:
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Airbill Number
		<i>[Signature]</i>	
Chain of Custody Seal Numbers			

Distribution: White - Accompany Shipment; Pink - Coordinator Field File; Yellow - Laboratory File

5-68423

Document No: R5-ARD-0003-r2
 Title: VOC Sampling
 Effective Date: 09/29/2017

APPENDIX D COMPENDIUM METHOD TO-15 CANISTER SAMPLING FIELD TEST DATA SHEET

VOCs _____ Method TO-15

COMPENDIUM METHOD TO-15 CANISTER SAMPLING FIELD TEST DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: _____ SHIPPING DATE: _____
 SITE ADDRESS: _____ CANISTER SERIAL NO.: _____
 _____ SAMPLER ID: _____
 SAMPLING DATE: _____ OPERATOR: _____
 CANISTER LEAK _____
 CHECK DATE: _____

B. SAMPLING INFORMATION

	TEMPERATURE				PRESSURE	
	INTERIOR	AMBIENT	MAXIMUM	MINIMUM	CANISTER PRESSURE	
START						
STOP						

	SAMPLING TIMES		FLOW RATES		
	LOCAL TIME	ELAPSED TIME METER READING	MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
START					
STOP					

SAMPLING SYSTEM CERTIFICATION DATE: _____
 QUARTERLY RECERTIFICATION DATE: _____

C. LABORATORY INFORMATION

DATA RECEIVED: _____
 RECEIVED BY: _____
 INITIAL PRESSURE: _____
 FINAL PRESSURE: _____
 DILUTION FACTOR: _____
 ANALYSIS
 GC-FID-ECD DATE: _____
 GC-MSD-SCAN DATE: _____
 GC-MSD-SIM DATE: _____
 RESULTS*: _____

 GC-FID-ECD: _____
 GC-MSD-SCAN: _____
 GC-MSD-SIM: _____

 SIGNATURE/TITLE

Figure 9. Canister sampling field test data sheet (FTDS).

